

APPENDIX D
NET WATER DEMAND AND
PER CAPITA WATER USE

Net Water Demand

Table D1 depicts net water demand in the study area for 1975-2020 for urban, agricultural, environmental, and other categories. Net water demand is the sum of all applied water except that which returns for reuse. Total net water demand decreased by about 800 acre-feet (AF) from the 30,900 AF in 1975 to 30,100 AF in 1995. Year 2020 total net water demand is expected to increase about 8,600 AF over 1995 levels. The large increase in total net demand from 1995 to 2020 is attributable to increased urban demand of about 6,300 AF and increased environmental demand of 2,800 AF. Average annual decreases of about 40 AF for net water demand were realized in the 20-year period 1975-1995 and an average annual increase of about 345 AF of net water demand is expected between 1995 and 2020.

Total net water demand overlying the main Santa Maria Groundwater Basin for 1975-2020 is depicted in Table D1. The groundwater basin total net water demand increased by about 2,700 AF from the 19,100 AF in 1975 to 21,800 AF in 1995. Year 2020 groundwater basin total net water demand is expected to increase about 7,300 AF over 1995 levels.

TABLE D1
NET WATER DEMAND IN STUDY AREA
Thousands of acre-feet*

Water Demand <i>Overlying the Main Santa Maria Groundwater Basin</i>	1975	1980	1985	1990	1995	2010	2020
Urban	5.2	6.5	9.6	10.6	9.1	13.1	15.4
<i>Groundwater Basin</i>	<i>5.0</i>	<i>6.2</i>	<i>9.1</i>	<i>10.3</i>	<i>8.5</i>	<i>12.4</i>	<i>14.5</i>
Agricultural	24.7	23.4	21.0	19.7	19.9	19.4	19.3
<i>Groundwater Basin</i>	<i>13.1</i>	<i>14.1</i>	<i>15.0</i>	<i>13.7</i>	<i>12.2</i>	<i>11.8</i>	<i>12.0</i>
Other**	1.0	1.0	1.1	1.1	1.1	4.0	4.0
<i>Groundwater Basin***</i>	<i>1.0</i>	<i>1.0</i>	<i>1.1</i>	<i>1.1</i>	<i>1.1</i>	<i>2.6</i>	<i>2.6</i>
Study Area Total	30.9	30.9	31.7	31.4	30.1	36.5	38.7
<i>Groundwater Basin Total</i>	<i>19.1</i>	<i>21.3</i>	<i>25.2</i>	<i>25.1</i>	<i>21.8</i>	<i>26.8</i>	<i>29.1</i>

*All values rounded to the nearest 100 acre-feet.

**Values for 2010 and 2020 include 2,800 AF of environmental demand.

***Values for 2010 and 2020 include 1,400 AF of environmental demand.

Per Capita Water Use

Per capita water use varies throughout the study area both temporally and spatially. Per capita water use data for the larger population centers were collected and analyzed to determine past, present, and future values. Water year values range from 106 gallons per capita per day in the

Guadalupe HA in 1995 to 379 gallons per capita per day in the Nipomo Mesa HSA in 1990. Table D2 depicts per capita water use for 1975-2020 by hydrologic area and hydrologic subarea. Per capita water use data for the major water agencies in the study area were weighted by population to determine the per capita water use by hydrologic area and hydrologic subarea. The maximum per capita water use for each hydrologic area and hydrologic subarea was attained in either 1985 or 1990, with rates steadily declining through 1995. Projections indicate that, in general, per capita rates will increase through 2000; however, the increases are not expected to reach the maximums attained in 1985 and 1990.

Values for per capita water use shown in Table D2 account for past, present, and future urban water conservation. The values have been adjusted by the Department's Land and Water Use staff to account for the area's water conservation measures that are currently in effect and those expected to be in the future.

TABLE D2
PER CAPITA WATER USE

Water Year	Pismo/Oceano HSA		Nipomo Mesa HSA		Guadalupe HA	
	GPCD*	AFPCA**	GPCD	AFPCA	GPCD	AFPCA
1975	131	0.147	229	0.257	119	0.134
1980	153	0.171	269	0.302	113	0.126
1985	194	0.217	339	0.380	133	0.150
1990	174	0.195	379	0.425	139	0.156
1995	146	0.164	251	0.282	106	0.119
2010	154	0.173	246	0.275	115	0.129
2020	154	0.173	246	0.275	115	0.129

*GPCD - Gallons Per Capita Per Day

**AFPCA - Acre Feet Per Capita Annually

Urban Net Demand

Urban net water demand for 1975-2020 is shown in Table D3. Urban net water demand was obtained by subtracting from the applied water demand the amount of water that was reusable (such as that which percolated to the groundwater basin). It is, in other words, the amount of applied water that was lost by evapotranspiration, percolation to saline sinks, flow to the ocean, or evaporation. Total urban net water demand increased by about 3,900 AF from the 5,200 AF in 1975 to 9,100 AF in 1995. Year 2020 urban net water demand is expected to increase 6,300 AF over 1995 levels. An average annual increase in urban net water demand of 195 AF was realized in the 20-year period 1975-1995. Average annual urban net water demand is projected to

TABLE D3
URBAN NET WATER DEMAND
Thousands of acre-feet

Hydrologic Area/Subarea <i>Division Within Main Santa Maria Groundwater Basin</i>	1975	1980	1985	1990	1995	2010	2020
Pismo/Oceano HSA	3.8	4.6	6.8	7.0	6.2	8.3	9.4
<i>Tri-Cities Mesa - Arroyo Grande Plain**</i>	<i>3.7</i>	<i>4.4</i>	<i>6.5</i>	<i>6.5</i>	<i>5.8</i>	<i>7.9</i>	<i>8.9</i>
Nipomo Mesa HSA							
<i>Nipomo Mesa***</i>	<i>1.1</i>	<i>1.6</i>	<i>2.3</i>	<i>3.3</i>	<i>2.3</i>	<i>3.9</i>	<i>5.0</i>
Guadalupe HA	0.2	0.2	0.4	0.5	0.4	0.6	0.7
<i>Santa Maria Valley</i>	<i>0.2</i>	<i>0.2</i>	<i>0.3</i>	<i>0.5</i>	<i>0.4</i>	<i>0.6</i>	<i>0.6</i>
Study Area Total	5.2	6.5	9.6	10.6	9.1	13.1	15.4
<i>Groundwater Basin Total</i>	<i>5.0</i>	<i>6.2</i>	<i>9.1</i>	<i>10.3</i>	<i>8.5</i>	<i>12.4</i>	<i>14.5</i>

Note: All values rounded to the nearest 100 acre-feet.

*Demand values derived by multiplying population by per capita water use.

**Division includes lower Pismo Creek and Los Berros Creek portions of the main groundwater basin.

***This portion of the main groundwater basin lies entirely within the HSA.

increase by over 250 AF between 1995 and 2020. Population increases of 51 and 59 percent during the 1975 through 1995 and 1995 through 2020 periods account for the increased urban net water demand, respectively.

Total urban net water demand overlying the main Santa Maria Groundwater Basin for 1975-2020 is also depicted in Table D3. It increased by about the same amount as in the entire study area.

Agricultural Net Demand

Agricultural net water demand by hydrologic area and hydrologic subarea for 1975-2020 is shown in Table D4. Agricultural net water demand depicted in Table D4 represents the amount of water that was needed to meet all agricultural requirements. Agricultural net water demand decreased by almost 25 percent from the 24,600 AF in 1975 to 19,700 AF in 1995. Year 2020 agricultural net water demand is expected to decrease about 600 AF from 1995 levels. The reduction in demand for the two periods is attributable to a reduction in crop acres and increased irrigation efficiency.

Total agricultural net water demand overlying the main Santa Maria Groundwater Basin for 1975-2020 is depicted in Table D4. It decreased about 900 AF between 1975 and 1995 and is expected to decrease by another 200 AF by 2020.

TABLE D4
AGRICULTURAL NET WATER DEMAND
Thousands of acre-feet

Hydrologic Area/Subarea <i>Division Within Main Santa Maria Groundwater Basin</i>	1975	1980	1985	1990	1995	2010	2020
Pismo/Oceano HSA*	7.5	7.5	6.9	7.1	7.2	7.0	6.8
<i>Tri-Cities Mesa - Arroyo Grande Plain**</i>	<i>3.4</i>	<i>3.1</i>	<i>2.8</i>	<i>2.6</i>	<i>2.3</i>	<i>2.2</i>	<i>2.2</i>
Nipomo Mesa HSA	1.1	1.4	1.7	1.5	1.3	1.3	1.3
<i>Nipomo Mesa***</i>	<i>1.1</i>	<i>1.4</i>	<i>1.7</i>	<i>1.5</i>	<i>1.3</i>	<i>1.3</i>	<i>1.3</i>
Guadalupe HA	16.0	14.5	12.5	11.1	11.2	10.9	11.0
<i>Santa Maria Valley</i>	<i>8.6</i>	<i>9.6</i>	<i>10.5</i>	<i>9.6</i>	<i>8.6</i>	<i>8.3</i>	<i>8.5</i>
Study Area Total	24.6	23.4	21.1	19.7	19.7	19.2	19.1
<i>Groundwater Basin Total</i>	<i>13.1</i>	<i>14.1</i>	<i>15.0</i>	<i>13.7</i>	<i>12.2</i>	<i>11.8</i>	<i>12.0</i>

Note: All values rounded to the nearest 100 acre-feet.

*The irrigated cropped acres in Pismo HSA for 1975 were 11.4; 1985, 26.6; and 1995, 0.0. Demand associated with these acreages amounted to less than 100 AF; therefore, the demand was combined for the two HSAs.

**Division includes lower Pismo Creek and Los Berros Creek portions of the main groundwater basin.

***This portion of the main groundwater basin lies entirely within the HSA.

Values for agricultural net water demand shown in Table D4 account for past, present, and future agricultural water conservation. The values have been adjusted by the Department's Land and Water Use staff to account for the area's water conservation measures that are currently in effect and those expected to be in the future.

Environmental Net Demand

Environmental net water demands are assumed to be equal to applied amounts shown in Table 2 of Chapter III. San Luis Obispo County is studying requirements for water to be released for steelhead trout to Arroyo Grande Creek below Lopez Dam. Until the study is complete, it is making proposed annual releases of 2,800 AF from Lopez Reservoir for maintaining steelhead habitat. Releases of 2,800 AF began in the fall of 1998 and are expected to continue indefinitely. They are included in the Pismo/Oceano HSA numbers for 2010 and 2020 in Table D5.

The stretch of Arroyo Grande Creek overlying the main groundwater basin is about half the creek's length from Lopez Dam to the confluence with the Pacific Ocean. Therefore, the 2010 and 2020 environmental demands depicted in Table D5 for the Tri-Cities Mesa and Arroyo Grande Plain are half the county's proposed release of 2,800 AFY.

TABLE D5
OTHER NET WATER DEMAND*
Thousands of acre-feet

Hydrologic Area/Subarea <i>Division Within Main Santa Maria Groundwater Basin</i>	1975	1980	1985	1990	1995	2010	2020
Pismo/Oceano HSA**	0.05	0.05	0.09	0.09	0.09	2.92	2.94
<i>Tri-Cities Mesa - Arroyo Grande Plain***</i>	<i>0.05</i>	<i>0.05</i>	<i>0.09</i>	<i>0.09</i>	<i>0.09</i>	<i>1.52</i>	<i>1.54</i>
Nipomo Mesa HSA							
<i>Nipomo Mesa⁺</i>	<i>0.95</i>	<i>0.95</i>	<i>0.96</i>	<i>0.96</i>	<i>0.97</i>	<i>0.97</i>	<i>0.98</i>
Guadalupe HA	0.03	0.04	0.04	0.05	0.06	0.07	0.08
<i>Santa Maria Valley</i>	<i>0.03</i>	<i>0.04</i>	<i>0.04</i>	<i>0.05</i>	<i>0.06</i>	<i>0.07</i>	<i>0.08</i>
Study Area Total	1.03	1.04	1.09	1.10	1.12	3.96	4.00
<i>Groundwater Basin Total</i>	<i>1.03</i>	<i>1.04</i>	<i>1.09</i>	<i>1.10</i>	<i>1.12</i>	<i>2.56</i>	<i>2.60</i>

Note: All values rounded to the nearest 10 acre-feet.

*Values for 2010 and 2020 are estimated based on historical trends.

**Values for 2010 and 2020 include 2,800 AF of applied environmental demand.

***Values for 2010 and 2020 include 1,400 AF of applied environmental demand - half of the release is attributable to the area overlying the main groundwater basin. Division includes lower Pismo Creek and Los Berros Creek portions of the main groundwater basin.

⁺This portion of the main groundwater basin lies entirely within the HSA.

Other Net Demand

The other net water demand category consists of conveyance losses, cooling, miscellaneous, and recreational water demands. Table D5 lists net other water demands by hydrologic area and hydrologic subarea for the study area for 1975-2020. Water demand for this category increased by about 90 AF from the 1,030 AF in 1975 to 1,120 AF in 1995, mostly attributable to increased use at recreational facilities. Year 2020 other net water demand is expected to increase about 2,800 AF over 1995 levels. Environmental net demand of 2,800 AF makes up the largest portion of the increase between 1995 and 2020 with increased use of the area's recreational facilities responsible for about 50 AF of the expected increase. Increased Lopez Reservoir deliveries to contractors resulting in increased conveyance losses, increased cooling requirements, and increased miscellaneous uses account for the remainder of the increase from 1995 through 2020. The recreational water demand at Lopez Lake is not included in this study because it is considered part of the natural supply of Lopez Reservoir and so does not enter into any of this study's calculations.